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(54) Title: RESIN COMPOSITION, AND CONTAINER PACKAGING FILM, CONTAINER PACKAGING BAG AND CONTAINER PACKAGE USING THE RESIN COMPOSITION

(57) Abstract: The present invention is aimed to provide a resin composition suitable for a container packaging film that has excellent appearance and antiblocking properties, and has no fear of contamination into the container.The present invention relates to resin composition comprising from 40 to 90 mass % of a propylene-base polymer and from 10 to 60 mass % of a high-density polyethylene (the total of the propylene-base polymer and the high-density polyethylene is 100 mass %), the composition substantially not containing a lubricant and not containing an antiblocking agent, and the ratio of MFR of the propylene-base polymer at 230 °C to MFR and the high-density polyethylene at 190 °C being from 5 to 200.The present invention also relates to a container packaging film, sealant film, laminate, container packaging bag, and container package using the resin composition of the present invention.

DESCRIPTION

Resin Composition, and Container Packaging Film, Container Packaging Bag and Container Package Using the Resin Composition

Cross-Reference to Related Application

This application claims the benefit pursuant to 35 U.S.C. 119(e)(1) of U.S. Provisional Application, No. 60/350,030 filed January 23, 2002; and the benefit pursuant to the priority of the Paris Convention of Japanese Patent Applications, JP-2001-397606, filed on December 27, 2001, and JP-2002-335008, filed on November 19, 2002.

Technical Field

The present invention relates to a resin composition and to a container packaging film and the like used in a container packaging bag for housing a container filled with a food or a medicament. More specifically, the present invention relates to a container packaging film ensuring excellent appearance and excellent antiblocking property between a container and a container packaging bag after high-pressure steam sterilization, and also a sealant film, a laminate, a container packaging bag and a container package using the container packaging film.

Background Art

Conventionally, packaging of housing a container filled with a food, a medicament or the like in a container packaging bag has been performed. The purpose of packaging varies depending on use and the container packaging bag is being used for various purposes, for example, for the purpose of mainly protecting the contents from deterioration, such as prevention of scratches on the container surface, prevention of mechanical damage of the container itself and prevention of permeation of oxygen or ultraviolet light, and for the purpose of describing the contents in the container, such as clarification of contents or handling standard by printing or the like.

The problem often encountered in packaging a container in a container packaging bag is that the container and the container packaging bag undergo blocking during storage of the packaged container in a storehouse or the like and the container cannot be easily taken out from the container packaging bag on use. From the aspect of safety and hygiene, the case of subjecting a container package obtained by packaging a container in a container packaging bag to high-pressure steam sterilization before use is recently increasing. Furthermore, for increasing productivity, the high-pressure steam sterilization temperature is sometimes more elevated to shorten the high-pressure steam

sterilization time. The blocking is more liable to occur as the temperature increases and therefore, it is a great technical subject demanded for the container package to solve this problem of blocking. In the case where the container is a medical container, for more stably maintaining constant the quality of the contents in the container, the high-pressure steam sterilization is performed by depressurizing the container package to reduce the volume between the medical container and the container packaging bag and to provide a state in which the container packaging bag and the medical container are in tight contact. In the container package used under such conditions, blocking is readily generated.

As one method for preventing the blocking, there has been employed a method of selecting the materials for the contact surface between the container and the container packaging bag to be of different materials or to use a construction material having a high melting point or glass transition temperature and having high heat resistance. This method is effective, but on the other hand, the construction material, constitution and the like of the container or film are disadvantageously limited. For example, heat-sealing is generally acknowledged as a most inexpensive method for forming a container packaging film into a bag to obtain a container packaging bag and the

materials widely used for the container packaging bag suitable for the heat-seal are propylene-base or ethylene-base polymers, so-called polyolefins. If these are limited, it raises a great problem in profitability and this is not preferred.

As another method for preventing the blocking, there is known a method of physically roughening the surface of the heat-seal layer of film to reduce the contact area with the container as in the case of wrapping a polyolefin-base container with a film having a heat-seal layer composed of a polyolefin-base resin. Specific examples of this method include a method of imparting a roughness to the film by roughening treatment (e.g. Japanese Unexamined Patent Application, First Publication No. Hei 5-309124), a method of imparting a physical deformation to the film by crimping, embossing, or the like. Other method using a resin composition includes a method in which a polymer composition comprising polybutene-1 and polypropylene and/or poly-4-metylpentene-1 is used for inner surfaces of a container packaging bag(e.g., Japanese Unexamined Patent Application, First Publication No. Hei 5-31156). Furthermore, a method of adding an additive to the polyolefin constituting the heat-seal surface of film can be used. The additive used here includes an inorganic filler such as silica and talc, an organic antiblocking agent such as spherical crosslinked

methyl methacrylate, a metallic soap-base lubricant such as calcium stearate, and a fatty acid amide-base lubricant often used as a slipping agent of film, such as erucic acid amide.

However, these methods have a problem in that the film appearance becomes poor or the additive bleeds and adheres to the container. Furthermore, if the temperature for high-pressure steralization exceeds 121°C, then sufficient antiblocking cannot be achieved. In particular, depending on the construction material of the container, the additive contained in the container packaging bag may pass through the wall of the container by the operation such as high-pressure steam sterilization performed in the state of the container being in tight contact with the container packaging bag and this causes mingling of a foreign matter or deterioration of the contents. Therefore, a container packaging bag using substantially no additive, having excellent appearance and also exhibiting antiblocking property is being demanded.

Under these circumstances, the present invention has been made and the main object of the present invention is to provide a resin composition comprising a polyolefin-base material and suitable for a container packaging film having excellent appearance and antiblocking property and free from fear of mingling of a foreign matter into the contents of

the container. Also, the object of the present invention is to provide a container packaging film comprising the resin composition of the present invention; a sealant film, a laminate, a container packaging bag and a container package using the container packaging film. The reason why these preferred properties are imparted is not clearly known but it is presumed that by using a resin composition comprising specific polyolefin-base materials, the surface is uniformly roughened and the contact area with a container is reduced, as a result, the blocking property is decreased even if an antiblocking agent is not substantially used.

Disclosure of the Invention

As a result of extensive investigations to attain the above-described objects, the present inventors have found that these objects can be attained by forming a resin composition comprising a combination of specific polyolefin-base resins into a container packaging film and using the film for the surface to come into contact with a container. The present invention has been accomplished based on this finding. More specifically, the present invention relates to a resin composition and a container packaging film, a sealant film, a laminate, a container packaging bag and a container package using the resin composition, shown in the following (1) to (10).

(1) A resin composition comprising from 40 to 90 mass% of a propylene-base polymer and from 10 to 60 mass% of a high-density polyethylene (the total of the propylene-base polymer and the high-density polyethylene is 100 mass%), and substantially not containing a lubricant and not containing an antiblocking agent, and the ratio of MFR of the propylene-base polymer at 230°C to MFR of the high-density polyethylene at 190°C being from 5 to 200.

(2) A container packaging film made from a composition comprising a propylene-base polymer and a high-density polyethylene, the coefficient of kinetic friction between the container packaging films after high pressure steam sterilization at 125 °C for 30 min. being 0.4 or less, and substantially not containing a lubricant and not containing an antiblocking agent.

(3) A container packaging film made from a composition comprising from 40 to 90 mass% of a propylene-base polymer and from 10 to 60 mass% of a high-density polyethylene (the total of the propylene-base polymer and the high-density polyethylene is 100 mass%), the ratio of MFR of the propylene-base polymer at 230°C to MFR of the high-density polyethylene at 190°C being from 5 to 200, and substantially not containing a lubricant and not containing an antiblocking agent.

(4) A sealant film comprising a support layer and a

sealant layer, wherein the sealant layer is the container packaging film described in (2) or (3).

(5) A laminate comprising a layer composed of the container packaging film described in (2) or (3), or the sealant film described in (4), and at least one layer selected from the group consisting of a gas barrier layer, a printing layer and a protective layer.

(6) A container packaging bag, wherein the surface coming into contact with a container is the container packaging film described in (2) or (3).

(7) A container package, wherein a container is housed in the container packaging bag described in (6) and subjected to high-pressure steam sterilization.

(8) The container package as described in (7), wherein the high-pressure steam sterilization temperature is 121°C or more.

(9) The container package as described in (7) or (8), wherein the container is a medical container.

(10) The container package as described in any one of (7) to (9), wherein the outer surface of the container, coming into contact with the container packaging bag is composed of a propylene-base polymer.

Best Mode for Carrying Out the Invention

The present invention is described in detail below.

The propylene-base polymer for use in the present

invention is a propylene homopolymer or a propylene·α-olefin copolymer containing a propylene and an α-olefin having from 2 to 20 carbon atoms except for propylene. Examples of the α-olefin include ethylene, 1-butene, 1-pentene, 1-hexene, 4-methylpentene-1, 1-octene, 1-decene and 1-dodecene. These are used individually or in combination of two or more thereof. Among these α-olefins, preferred are ethylene, 1-butene, 1-pentene, 1-hexene, 4-methylpentene-1 and 1-octene, more preferred is ethylene. As for the kind of the copolymer, examples thereof include a random copolymer and a so-called block copolymer commonly called high-impact polypropylene. Among these, a block copolymer is preferred because when a sealant film described later is formed, the interlayer adhesive strength with the support layer and the flexibility are excellent. The catalyst used at the production of the propylene-base polymer is not particularly limited, and a metallocene-base catalyst other than a conventional Ziegler·Natta catalyst can be used. These can be produced by various production processes such as bulk process, solution process, slurry process and gas-phase process.

The MFR (melt flow rate) of the propylene-base polymer measured in accordance with JIS K 7210 under the conditions of a temperature of 230°C and a load of 21.18N is preferably from 0.1 to 50 g/10 min. If the MFR is less than this range,

the moldability is liable to decrease, whereas if the MFR exceeds this range, the strength and the heat-seal property are liable to decrease. The MFR is more preferably from 0.1 to 20 g/10 min, still more preferably from 0.25 to 20 g/10 min.

The high-density polyethylene for use in the present invention is an ethylene homopolymer or an ethylene·α-olefin copolymer containing an ethylene and an α-olefin having from 3 to 20 carbon atoms. Preferable examples of the α-olefin include propylene, 1-butene, 1-pentene, 1-hexene, 4-methylpentene-1, 1-octene, 1-decene and 1-dodecene. These are used individually or in combination of two or more thereof. Among these, preferred are 1-butene, 1-pentene, 1-hexene, 4-methylpentene-1 and 1-octene.

The density of the high-density polyethylene used in the present invention is usually 0.940 g/cm^3 or more, preferably 0.945 g/cm^3 or more, more preferably 0.950 g/cm^3 or more. The upper limit is not particularly limited but is about 0.965 g/cm^3. If the density is less than 0.940 g/cm^3, poor antiblocking property is liable to result and particularly when sterilization is performed at a temperature exceeding 121°C, the antiblocking property is liable to greatly decrease.

The MFR of the high-density polyethylene measured in accordance with JIS K 7210 under the conditions of a

temperature of 190°C and a load of 21.18N is preferably from 0.05 to 50 g/10 min. With MFR in this range, the resin composition can have a melt tension in an appropriate range and a film can be easily molded. The MFR is more preferably from 0.05 to 20 g/10 min, still more preferably from 0.1 to 10 g/10 min.

As for the blending ratio of the propylene-base polymer and the high-density polyethylene in the resin composition of the present invention, assuming that the total of the propylene-base polymer and the high-density polyethylene is 100 mass%, the propylene-base polymer is from 40 to 90 mass%, preferably from 60 to 80 mass%. If the ratio of the propylene-base polymer blended is less than 40 mass%, the appearance of the container packaging film is worsened or the heat resistance is disadvantageously insufficient, whereas if the ratio of the propylene-base polymer blended exceeds 90 mass%, the antiblocking property deteriorates.

In the resin composition of the present invention, the ratio [MFR(PP)/MFR(HD)] of MFR of the propylene-base polymer [MFR(PP)] to MFR of the high-density polyethylene [MFR(HD)] is from 5 to 200, preferably from 10 to 100, more preferably from 15 to 50. If the MFR(PP)/MFR(HD) is less than 5, the antiblocking property may not be sufficiently high, whereas if it exceeds 200, problems disadvantageously arise in the

moldability or in the film appearance, for example, gel, fish eye or the like is readily generated on the container packaging film.

The container packaging film of the present invention is made from a resin composition comprising a propylene-base polymer and a high-density polyethylene, and not substantially containing lubricant and not containing antiblocking agent, wherein the coefficient of kinetic friction between the container packaging films after high pressure steam sterilization at 125 °C for 30 min. is 0.4 or less, Herein, the coefficient of kinetic friction is a value obtained according to JIS K 7125. If the coefficient of kinetic friction is 0.4 or less, then ease of opening of a container packaging film ameliorates and container can be more easily taken out of the container package. Furthermore, the coefficient of kinetic friction tends to be decreased if the blending ratio of the high-density polyethylene is decreased. Moreover, the container packaging film made from the resin composition of the present invention has excellent heat resistance and antiblocking properties.

The method for obtaining the container packaging film of the present invention is not particularly limited and this film can be obtained, for example, by mixing respective components for use in the resin composition of the present invention in a mixer such as mixing roll, Banbury mixer,

Henschel, tumbler and ribbon blender, once forming the mixture into pellets using an extruder or the like, and thereafter molding a film according to various film molding methods. Examples of the film molding method include a method of producing a film by a water cooling or air cooling extrusion inflation method or a T-die casting method. The thickness of the container packaging film of the present invention is from 30 to 300 μm, preferably from 30 to 200 μm.

The container packaging film of the present invention can be used as a single layer sealant film but can also be used as a sealant film where a sealant layer and a support layer are laminated using the container packaging film as the sealant layer. By laminating with a support layer, a sealant film having high transparency and having high smoothness in the support layer side can be obtained. The support layer is not particularly limited but general polyolefins such as ethylene-base polymer and propylene-base polymer can be used. Among these, a propylene-base polymer is preferred because of its high heat resistance. Examples of the propylene-base polymer include homopolypropylene, propylene·ethylene random copolymer and propylene·ethylene block copolymer. Among these, propylene·ethylene block copolymer is preferred because of high impact resistance. The ratio in the thickness between the support layer and the sealant layer is preferably support layer/sealant layer = 50

to 95/ 5 to 50.

The laminate of the present invention comprises a layer composed of the container packaging film or sealant film of the present invention, and at least one layer selected from the group consisting of a gas barrier layer, a printing layer and a protective layer. The material for use in the gas barrier layer, printing layer and protective layer is not particularly limited but specific examples thereof include polyethylene, polypropylene, ethylne·vinyl acetate copolymer saponification product (EVOH), aluminum foil, biaxially stretched or non-stretched polyamide, biaxially stretched or non-stretched polyethylene terephthalate (PET) or polyethylene naphthalate (PEN), aluminum oxide-deposited PET and silica-deposited PET.

For obtaining the laminate of the present invention various known molding methods can be used. Specific examples thereof include a method of simultaneously molding a plurality of layers by melt molding, such as water cooling or air cooling (co)extrusion (multilayer) inflation method and (co)extrusion (multilayer) T-die casting method, a method of molding single layer films or sheets and laminating these films or sheets using an adhesive or the like, such as dry lamination method, and a method of previously molding one part film or sheet and melt-laminating the other part film or sheet thereon, such as

extrusion lamination method. Among these, a water cooling or air cooling (co)extrusion (multilayer) inflation method and a (co)extrusion (multilayer) T-die method are preferred.

The container packaging bag of the present invention is obtained by forming the container packaging film or sealant film of the present invention into a bag using heat-seal. For the surface to come into contact with a container, the container packaging film composed of the resin composition of the present invention is used. When a container is housed and packaged therein, blocking with the container is not generated and the appearance is good. The container packaging bag can be obtained by using the container packaging film, sealant film or laminate of the present invention and heat-sealing it into a bag form by means of heat, high-frequency wave, ultrasonic wave or the like. A method of obtaining the container after vacuum molding may also be used. Furthermore, the resin composition of the present invention can be also formed into a container from the beginning by a hollow molding method or the like. Needless to say, a surface of the container packaging film can be subjected to roughening treatment, depending on the use.

The container package of the present invention is obtained by housing a container in the container packaging bag of the present invention and subjecting it to high-

pressure steam sterilization. For the high-pressure steam sterilization, a method such as submerging system and spray system commonly used in the retort field and medical field is used. Particularly, from the standpoint of, for example, elevating the productivity, keeping the taste of food or improving the sterilization property, the high-pressure steam sterilization temperature which has been heretofore on the order from 100 to 115°C is recently elevated and a high-pressure steam sterilization temperature of 121°C or more is employed. The construction material of the container is also changing from polyethylene, vinyl chloride and the like to propylene-base polymer and the like having high heat resistance and the high-pressure steam sterilization is performed after packaging a container. The container includes a single layer container composed of a single material and a multilayer container composed of various materials. In either case, an adhesive layer may be provided, if desired. In view of moldability and profitability, polyolefin-base resins are used as the container material in many cases. The container package housing such a container exhibits superior heat resistance and very excellent antiblocking property after the high-pressure steam sterilization at 121°C or more, and also exhibits excellent antiblocking property after high pressure steralization at 125°C. Particularly, in the case where the

container is composed of a polyolefin-base resin-made flexible sheet or film, the container is tightly contacted with the container packaging bag to readily generate blocking. However, even in such a case, the container package of the present invention scarcely undergoes blocking. Furthermore, in the case of a film bag, a blow bag, a blow bottle and the like used as a medical container for high calorie infusion, peritoneal dialysis infusion (CAPD) or the like, the container package of the present invention free from fear of bleeding of an antiblocking agent is advantageous.

When a propylene-base polymer is used for the surface of a container coming into direct contact with the container packaging bag of the present invention, namely, the outer surface of the container, a propylene-base copolymer comprising ethylene or butene-1 as a copolymerization component, or a propylene-base polymer having added thereto an elastomer component such as styrene-base elastomer and olefin-base elastomer is sometimes used so as to impart flexibility to the container. The propylene-base copolymer or propylene-base polymer containing an elastomer component readily undergoes blocking as compared with a propylene homopolymer and therefore, the effect of the container package of the present invention having excellent antiblocking property is more clearly exerted.

In the resin composition comprising a specific propylene-base polymer and a specific high-density polyethylene of the present invention, other polymers can of course be blended within a range so as not to impair the object of the present invention. Specific examples of such a polymer include a so-called high-pressure low-density polyethylene, a linear low-density polyethylene, an ethylene·α-olefin elastomer, various styrene-base elastomers such as styrene·butadiene elastomer, an ethylene·vinyl acetate copolymer, an ethylene·(meth)acrylic acid ester copolymer, an ethylene·(meth)acrylic acid copolymer and its ionomer; however, the present invention is not limited thereto. The blending ratio of the other polymers to the whole resin composition of the present invention is less than 40 mass%, and preferably less than 20 mass%. In particular, if an amount of the other polymers except polyolefin, such as styrene-base elastomers is increased, then a heat seal strength of a portion to be heat-sealed in the container packaging tends to deteriorate.

Also, in the sealant film, laminate and container packaging bag of the present invention, an organic or inorganic filler and other commonly used known additives such as antistatic agent, antioxidant, anticlouding agent, organic or inorganic pigment, ultraviolet absorbent and dispersant may be appropriately blended, if desired, so as

to, for example, improve the strength, reduce the volume or lower the calorie at the burning for disposal, within the range of not seriously impairing the effect of the present invention. However, in the resin composition and container packaging film of the present invention, a lubricant and an antiblocking agent are necessary to be substantially absent to such an extent of not causing bleeding. Herein, "substantially absent" means that a lubricant and antiblocking may be present to such an extent that they do not bleed. More specifically, it is preferable for an antiblocking agent to be present at 4000 ppm or less, and for a lubricant to be 4000 ppm or less. It is more preferable for the antiblocking agent to be 1000 ppm or less, and for the lubricant to be 1000 ppm or less. Most preferably, they are not contained at all.

Examples

The present invention is described in greater detail below by referring to Examples and Comparative Examples, however, the present invention is not limited to the Examples.

The propylene-base polymer and high-density polyethylene used are described below. The MFR of propylene-base polymer was measured in accordance with JIS K 7210 at a temperature of 230°C under a load of 21.18N. The MFR of

high-density polyethylene was measured in accordance with JIS K 7210 at a temperature of 190°C under a load of 21.18N.

(Propylene-Base Polymer)

A1: Propylene homopolymer having an MFR of 15 g/10 min.

A2: Propylene·ethylene random copolymer having an MFR of 5 g/10 min, ethylene content: 4.3 mass%.

A3: Propylene·ethylene block copolymer having an MFR of 2.2g/10 min.

(High-Density Polyethylene)

B1: MFR: 1 g/10 min, density: 0.960 g/cm^3

B2: MFR: 0.6 g/10 min, density: 0.955 g/cm^3

(Additives)

C1: Aluminosilicate (Silica-base antiblocking agent)

C2: Polymethyl methacrylate (PMMA)-base antiblocking agent

A method for measuring physical properties is described below.

(Coefficient of Kinetic Friction)

1000mL of water was put into a container packaging bag having an inner dimension of 30 X 30 cm, with three edges were heat-sealed, and then remaining one edge was heat-sealed to prepare a container packaging bag containing water. The water-containing container packaging bag was subjected to sterilization treatment at 125 °C for 30 min using a spray-system high-pressure steam sterilizer, and then the bag was opened to discard the water. Coefficients of

kinetic friction of the inner surfaces of the bag that was air-dried was measured according to JIS K 7125, under the conditions of 23°C X 50% RH and using a measuring device, Friction Tester Type TR (manufactured by Toyo Precision Machine, Ltd.).

The method of preparing samples is describe below.

(Container)

The propylene·ethylene random copolymer of A2 was molded at a temperature of 230°C using a T-die film casting machine to obtain a film having a thickness of 200 μm. This film was cut into 20 cm × 20 cm square, two films were combined and three edges of one film were heat-sealed with three edges of another film, respectively, at temperature of 180°C and pressure of 0.2MPa, for 1 second with heat-sealing width being 10 mm, to obtain a container. After filling 1 liter of distilled water in this container, the remaining one edge and another part one edge were heat-sealed and this was used as a container sample.

(Container Packaging Film, Container Packaging Bag, container Package and High-Pressure Steam Sterilization)

A propylene-base polymer, a high-density polyethylene and an additive were mixed by a Henschel mixer to give a composition shown in Table 1. The obtained composition was cast at a temperature of 230°C by a T-die casting machine to obtain a container packaging film of 70 μm. This film was

cut into a 35 cm square, two films were combined, and three edges of one film were heat-sealed with three edges of another film, respectively, at temperature of 180°C and pressure of 0.2MPa, for 1 second with heat-sealing width being 10 mm, to manufacture a container packaging bag. In this bag, the container sample prepared above was housed. Then, while depressurizing the inside by a vacuum pump, the remaining one edge and another part one edge of films were heat-sealed to obtain a container package.

This sample was subjected to a sterilization treatment at 125°C for 30 minutes using a spray-system high-pressure steam sterilizer.

The evaluation methods are described blow.

(Appearance)

The container after the high-pressure steam sterilization is taken out of the container packaging bag, and a region of 30 cm × 30 cm of the container package was divided into 9 sections each in a size of 10 cm × 10 cm and the roughened state of the inner and outer surfaces was observed with an eye. The number of sections in a uniform ground glass state and having a good appearance and the number of sections having a non-uniformly roughened surface and a poor appearance were counted and the evaluation was performed according to the following criteria:

○: The number of sections having a good appearance

is from 7 to 9.

△: The number of sections having a good appearance is from 4 to 6.

×: The number of sections having a good appearance is from 0 to 3.

(Antiblocking Property)

The container package after the high-pressure steam sterilization was opened and the container was taken out with a hand from the container package. The evaluation was performed according to the following criteria:

○: The container can be easily taken out without causing any catch or resistance.

△: Blocking is weakly generated between a part of the container and a part of the container packaging bag but the container can be easily taken out.

×: Strong blocking is generated between a part of the container and the container packaging bag and the container is taken out with difficulty.

(Film Impact)

Using the films that were obtained by division of the container packaging bag prepared by high pressure steam sterilization as for the measurement of coefficient of kinetic friction, the film impact was measure according to JIS P8184 under the conditions of 23°C and 50% RH.

Examples 1 to 5 and Comparative Examples 1 to 5

Using a resin composition of the kind and blending amount shown in Table 1, a container packaging film, a container packaging bag and a container package were manufactured. The appearance and antiblocking property were evaluated and the results obtained are shown in Table 1.

Examples 6 and 7

Two-layers sealant film having, as a sealant layer, a resin composition with the same kind and blending amount as in Example 1, and, as support layer, propylene-base polymer as shown in Table 2 was subjected to cast using a multi-layer T-die casting machine at 230°C. Evaluation of the film impact is shown in Table 2.

Table 1

	Propylene -Base Polymer (mass%)[1)]	High-Density Polyethylene (mass%)[1)]	Additive (parts by mass)[2)]	MFR (PP) / MFR (HD)	Coefficeint of Kinetic Friction (N/N)	Appearance of Film	Anti-blocking Property
Ex.1	A1 (70)	B1 (30)	0	15	0.28	○	○
Ex.2	A1 (50)	B1 (50)	0	15	0.29	△	○
Ex.3	A2 (80)	B2 (20)	0	8	0.30	○	△
Ex.4	A1 (70)	B2 (30)	0	25	0.29	○	○
Ex.5	A1 (30)	B1 (70)	0	15	0.36	×	○
Comp. Ex.1	A1 (100)	0	C1 (0.5)	-	0.45	×	△
Comp. Ex.2	A2 (100)	0	C2 (0.5)	-	0.48	×	×
Comp. Ex.3	0	B1 (100)	0	-	0.45	○	×
Comp. Ex.4	A1 (95)	B1 (5)	0	15	0.55	○	×

1) Blending ratio assuming that the total of propylene-base polymer + high-density polyethylene is 100 mass%.
2) Parts by mass per 100 parts by mass in total of propylene-base polymer + high-density polyethylene

Table 2

	Support Layer(mass%)	Thickness (Support Layer/Sealant Layer)(μm/μm)	Film Impact(unit kg*cm/mm)
Ex.6	A1(100)	40/10	120
Ex.7	A3(100)	40/10	260

Industrial Applicability

As described in detail in the foregoing pages, the container packaging film comprising the resin composition of the present invention uses an inexpensive polyolefin and therefore, costs low. The film has excellent appearance and antiblocking property and therefore, when formed into a container packaging bag, the container can be easily taken out. Furthermore, the film does not substantially contain a lubricant and not contain an antiblocking agent and free of fear of contamination of the container and therefore, can be used in the field of container packaging such as medical container packaging. Thus, the present invention is useful.

Claims

1. A resin composition comprising from 40 to 90 mass% of a propylene-base polymer and from 10 to 60 mass% of a high-density polyethylene (the total of the propylene-base polymer and the high-density polyethylene is 100 mass%), and substantially not containing a lubricant and not containing an antiblocking agent, the ratio of MFR of the propylene-base polymer at 230°C to MFR of the high-density polyethylene at 190°C being from 5 to 200.

2. A container packaging film made from a composition comprising a propylene-base polymer and a high-density polyethylene, the coefficient of kinetic friction between the container packaging films after high pressure steam sterilization at 125 °C for 30 min. being 0.4 or less, and substantially not containing a lubricant and not containing an antiblocking agent.

3. A container packaging film made from a composition comprising from 40 to 90 mass% of a propylene-base polymer and from 10 to 60 mass% of a high-density polyethylene (the total of the propylene-base polymer and the high-density polyethylene constitute 100 mass%), the ratio of MFR of the propylene-base polymer at 230°C to MFR of the high-density polyethylene at 190°C being from 5 to 200, and substantially not containing a

lubricant and not containing an antiblocking agent.

4. A sealant film comprising a support layer and a sealant layer, wherein the sealant layer is the container packaging film claimed in claim 2 or 3.

5. A laminate comprising a layer composed of the container packaging film claimed in claim 2 or 3, or the sealant film claimed in claim 4, and at least one layer selected from the group consisting of a gas barrier layer, a printing layer and a protective layer.

6. A container packaging bag, wherein the surface coming into contact with a container is the container packaging film claimed in claim 2 or 3.

7. A container package, wherein a container is housed in the container packaging bag claimed in claim 6 and subjected to high-pressure steam sterilization.

8. The container package as claimed in claim 7, wherein the high-pressure steam sterilization temperature is 121°C or more.

9. The container package as claimed in claim 7 or 8, wherein the container is a medical container.

10. The container package as claimed in any one of claims 7 to 9, wherein the outer surface of the container, coming into contact with the container packaging bag is composed of a propylene-base polymer.